**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

**International General Certificate of Secondary Education**

# MARK SCHEME for the May/June 2014 series

# 0610 BIOLOGY

**0610/62** Paper 6 (Alternative to Practical), maximum raw mark 40

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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| Question | Mark scheme | Mark | Guidance |
|---|---|---|---|
| 1 (a) | red ; | [1] | |
| (b) (i) | (surface area) $2(1 \times 1) + 4(2 \times 1)$ ;<br><br>10 ; | [2] | |
| (ii) | (volume) = 2 ;<br>$cm^3$ ; | [2] | **I** working<br>**A** both marks if correct answer |
| (c) (i) | Any **two** from:<br><br>stopclock / suitable measuring device / knife or scalpel / ruler / tile / beaker / forceps / test-tube rack ; | [1] | |
| (c) (ii) | table with 2 columns ;<br><br>column 1 heading <u>block / tube</u> ;<br><br>column 2 heading <u>time</u> ;<br><br>units column 2 – <u>seconds / s(ec)</u> ;<br><br>4 results recorded in seconds ; | [5] | |

| | | | |
|---|---|---|---|
| **(d)** | *1 observation from table:*<br><br>1 e.g. tube A took longest to change colour / tube B / C / D took less time to change colour / description of sequence ;<br><br>*explanation: Any 3 from:*<br>2 smaller pieces have (total) larger surface area / ora ;<br><br>3 idea of more surface area gives greater contact with the acid ;<br><br>4 <u>ref. to diffusion</u> ;<br><br>5 (so) the greater the surface area the faster (the colour change or reaction) / quicker the acid gets to the centre of the block;<br><br>6 tube C or D is likely to be an anomalous result/unlikely to be correct ; | [1]<br><br>[3] | |
| **(e)** | idea of only surface area is being changed / only one variable being changed ; | [1] | |

**(f)**

Any 2 × 2

| *source of error:* | *improvement:* |
|---|---|
| idea of cutting cubes accurately | use cutters / make up agar in premeasured moulds / template / use a more precise ruler / Vernier callipers / use a sharper knife ; |
| idea of contamination / damage to cubes from handling | wear gloves / use forceps or suitable instrument to move agar pieces ; |
| difficult to judge end point / AW | use white / black background / do each tube separately ; |
| small cubes stick together so not all surface area exposed | separate with a glass rod / spill / suitable apparatus ; |
| amount / volume / concentration of sulphuric acid poured into each tube | use a burette / graduated pipette / measuring cylinder ; |
| timing all at the same time (so end point missed) | time each separately ; |
| acid is added at different times ; | time each separately / stagger the start / method of adding acid at the same time ; |

[4]

*mark in pairs looking for a linked error and improvement*

| | | | |
|---|---|---|---|
| **(g) (i)** | bile required to emulsify / break down large fat droplets to smaller droplets ;<br><br>(this) increase the surface area of the fat to react with <u>enzyme</u> (so tube **F** has the fastest reaction ) ; | [2] | |
| **(ii)** | (as a) control / proves that the enzyme is needed for the reaction / for comparison ; | [1] | |
| | | **[Total: 23]** | |
| **2 (a) (i)** | Any two correct labels :<br><br>lamina / (leaf) blade ;<br><br>(leaf) edge / margin ;<br><br><u>Petiole</u> ;<br><br>midrib ;<br><br>vein ; | max [2] | |
| **(b) (i)** | allow 50–60 $cm^2$ ; | [1] | |
| **(ii)** | use a grid with smaller squares ; | [1] | |
| **(c)** | (H is lowest as)<br>it has a larger surface area / is the largest ;<br><br>to capture more light ; | [2] | |

| | | | |
|---|---|---|---|
| **(d) (i)** | **A** – axes labelled, with units and scaled evenly ;<br><br>**S** – size to fill at least ½ of grid ;<br><br>**P** – plot ;<br><br>**L** – line of best fit ; | [4] | accurate plots to ± 0.5 of grid square |
| **(ii)** | as surface area increases, water loss also increases ;<br><br>reference to the linear pattern / proportional increase or description / positive correlation/ some processing of data ; | [2] | |
| **(e)** | length of JK = 14 (mm) ; (measurement)<br><br>$\frac{(\text{length of stomata})}{(\text{magnification})} = \frac{14}{400}$ ; (formula)<br><br>= 0.035 (mm) ; (calculation) | [1]<br><br>[2] | **A** ecf for calculations from an incorrect measurement<br><br>Rounding of figures must be correct – '5' rounds up |

| | | | |
|---|---|---|---|
| **(f)** | any 2 of:<br>temperature ;<br>wind (speed) / air movement ;<br>light wavelength ;<br>time in the light / duration of light ;<br>humidity ;<br>age of leaf ;<br>species of plant / type of plant ;<br>carbon dioxide (concentration) ;<br>surface area of leaf ;<br>water supply to leaf / plant ; | max [2] | |
| | | **[Total: 17]** | |